Atty. Ref. 1005-1-3

SCREW HOOK SOCKET

CROSS REFERENCE TO RELATED APPLICATION

[1] This application claims priority from U.S. Provisional Application 60/492,504 titled, "ROUND SCREW HOOK FOR EXTENSION POLE," which was filed on August 4, 2003, and which is incorporated by reference.

BACKGROUND OF THE INVENTION

[2] A conventional screw hook ***100***, shown in **FIG.1**, is essentially a hook with a screw attached to the hook. Screw hooks ***100*** are used widely for anchoring a support point to a wall or ceiling in order to hang any number of objects from the hook portion ***110*** of the screw hook ***100***. The hook portion ***110*** allows one the convenience of hanging and unhanging objects without having to unanchor the screw hook ***100*** from the wall or ceiling. This convenience has led to the wide use of screw hooks ***100*** in many applications including, for example, hanging plants, Christmas lights, and television cable.

[3] The screw hook ***100*** of **FIG. 1** comprises a threaded (shank) portion ***105*** and the hook portion ***110***. The hook portion ***110*** is further defined by two straight runs ***120*** and

121 coupled by a curved run ***122***. The first straight run ***120*** forms a first member of the hook portion ***110*** which is attached to a bend point ***140*** of the shank portion ***105*** and the second straight run ***121*** forms the tip ***141*** of the hook portion ***110*** such that an opening ***130*** is formed. The opening ***130*** allows an object, such as a hanging wire or rope, to be inserted. Typically, the two straight runs ***120*** and ***121*** are parallel to each other.

[4] When anchoring the screw hook ***100*** to a wall or ceiling, rotational torque is applied to the screw hook ***100*** such that the threaded shank ***105*** engages the wall or ceiling. That is, the screw hook ***100*** is screwed into the wall. In some cases, a human hand can provide enough rotational torque to engage the threads with the wall. However, this is not always the case and a tool is typically required to increase the amount of rotational torque able to be applied to the screw hook ***100***. Further, a tool is also required if the location that the screw hook ***100*** will be installed is not accessible (too high, for example) by a human.

[5] One such tool used in the past is a pair of pliers (not shown). Pliers can secure the screw hook ***100*** in its fingers in order to provide more rotational torque to the screw hook ***100***. This tool, however, is only able to rotate as far as the human hand can rotate in one motion before the fingers must release the screw hook ***100*** and then engage it again before being able to rotate the screw hook ***100*** again. It is often the case that one rotational motion of the human hand is not enough for the screw hook's threads ***105*** to engage the surface enough to support its own weight. As such, the screw hook ***100*** falls out when the fingers of the pliers are released. Furthermore, pliers require one to be in close proximity to the location that the screw hook ***100*** is being installed. Therefore,

pliers are not a viable solution when the location to install the screw hook ***100*** is a high ceiling.

[6] Another tool that may be used to assist in installing a screw hook ***100*** is a scalloped interior socket tool (also not shown), such as the one described in U.S. Patent No. 5,622,090, filed on April 16, 1996 to Marks and assigned to WorkTools, Inc. of Chatsworth, California. Using this socket, fingers inside the socket retract to form a "pocket" around an object. In this fashion, any shape of object can be engaged and rotational torque can be applied.

[7] The retractable fingers, however, are biased outward. As such, when trying to anchor a screw hook ***100***, one must hold the screw hook ***100*** in the socket when installing. Otherwise the retractable fingers, being biased outward will push the screw hook ***100*** out of the socket before one can position the screw hook shank ***105*** against the wall. This will not work for situations when the screw hook ***100*** must be anchored on a high ceiling where one cannot hold the screw hook ***100*** in place until the shank's threads ***105*** engage the ceiling.

[8] Furthermore, because the retractable fingers are parallel to the longitudinal axis of the screw hook shank ***105***, the screw hook ***100*** may rotate away from the longitudinal axis of the socket. That is, the socket does not apply a force to the hook portion ***110*** in order to keep the screw hook shank ***105*** from rotating one way or another. As a result, the socket is not capable of maintaining the longitudinal axis of the shank ***105*** in alignment with its own longitudinal axis before the shank ***105*** engages the wall or ceiling.

[9] Therefore, it would be beneficial to have a tool that applies the proper forces to the hook portion ***110*** of the screw hook ***100*** in order to maintain parallel longitudinal axes of rotation (both the shank and the tool) while a screw hook ***100*** is being anchored.

SUMMARY OF THE INVENTION

[10] An embodiment of the invention is a tool comprising a drive shaft with a longitudinal axis and a socket attached to the drive shaft. The socket includes a cavity having a substantially rectangular opening defined by a pair of parallel side walls of the first side length and a U-shaped wall having two parallel walls adjacent to the opening and a curved portion of the U-shaped wall is opposite the opening. In this manner, the cavity is shaped to fit the contour of a typical screw hook such that the screw hook can be anchored to a wall or ceiling with relative ease because the screw hook will not rotate away from the longitudinal axis of the tool.

[11] Because screw hooks typically have straight parallel runs in the hook portion of the screw hook, the cavity that engages the screw hook is able to apply forces in directions that are not perpendicular to the longitudinal axis of the screw hook. As such, the screw hook will not rotate when engaged with the screw hook socket tool.

BRIEF DESCRIPTION OF THE DRAWINGS

[12] The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

[13] **FIG. 1** is a side view of a conventional screw hook;

[14] **FIG. 2** is a side view of a screw hook and a screw hook socket according to an embodiment of the invention;

[15] **FIG. 3** is an isometric view of the screw hook socket of **FIG. 2** engaged with the screw hook of **FIG. 1** according to an embodiment of the invention; and

[16] **FIG. 4** is an exploded view of the screw hook socket of **FIG. 2** with an extension pole mounting handle according to an embodiment of the invention.

DETAILED DESCRIPTION

[17] **FIG. 2** is a side view of a screw hook ***100*** and a screw hook socket ***200*** according to an embodiment of the invention. The screw hook socket ***200*** comprises a drive shaft ***215*** and a socket ***210***. The drive shaft ***215*** is typically hexagonal such that it fits securely in the chuck of a common power drill (not shown). However, any shape, such as square or round, may be used for the shank ***215*** of the screw hook socket ***200***. Additionally, the drive shaft ***215*** may include a notched end ***220*** separated by a groove ***221***. The notched end ***220*** allows the screw hook socket ***200*** to be used with a

typical "quick disconnect" interface with other tools, such as, for example, a ratchet, or an extension pole (also not shown).

[18] In this embodiment, the screw hook socket ***200*** is designed to be used with a power drill. Thus, a hexagonal drive shaft ***215*** is shown that is operable to engage the chuck of a power drill. The drive shaft ***215*** is coupled to the socket ***210*** which is designed to engage a typical screw hook ***100***. The socket ***200*** includes a cavity or enclosure formed having a rectangular opening ***211*** formed by a first pair of parallel side walls ***212*** and a second pair of parallel side walls ***214***. The cavity includes an enclosed end formed by a U-shaped wall ***213*** that is opposite the rectangular opening ***221***. These same features can also be seen more easily in the isometric view of the screw hook socket ***200*** in **FIG. 3** described below.

[19] Still referring to **FIG. 2**, the rectangular opening ***221*** is sufficiently wide enough and long enough to allow a typical screw hook ***100*** to be inserted into the cavity. The cavity is defined in length by the first pair of parallel side walls ***212***, in width by the second pair of parallel side walls ***214***, and in depth by the U-shaped wall ***213*** wherein the two sets of parallel walls ***212*** and ***214*** are adjacent to the rectangular opening ***211***. The curved portion of the U-shaped wall ***213*** is opposite the rectangular opening ***211***. In this manner, the interior contour of the cavity of the socket ***210*** matches the contour of a typical screw hook ***100***.

[20] **FIG. 3** is an isometric view of the screw hook socket ***200*** of **FIG. 2** engaged with a screw hook ***100*** according to an embodiment of the invention. As can be seen more readily in an isometric view, the rectangular opening ***211*** is defined in length by the first

pair of parallel side walls ***212*** wherein the length is approximately the length from the tip ***141*** of a typical screw hook ***100*** to its bend point ***140*** on its shank ***105***. Further, the rectangular opening ***211*** is defined in width by the second pair of parallel side walls ***214*** wherein the width is approximately the diameter of the shank ***105*** of a typical screw hook ***100***.

[21] The screw hook ***100*** in **FIG. 3** is shown engaged with the screw hook socket ***200***. As such, the cavity of the screw hook socket ***200*** fits the contour of the hook portion ***110*** of the screw hook ***100***. When engaged, the screw hook ***100*** is prevented from rotating about any axis because of the cavity.

[22] In the past, a screw hook ***100*** easily rotated about a horizontal axis ***310*** when one attempted to anchor the screw hook ***100*** to a wall. As can be seen in **FIG. 3**, the screw hook ***100*** is prevented from rotating on the horizontal axis ***310*** when engaged with the screw hook socket ***200***. If the screw hook ***100*** begins to rotate clockwise on the horizontal axis ***310***, a force ***301*** from the lower of the first pair of parallel side walls ***212*** is applied to the second straight run ***121*** of the screw hook ***100***. Likewise, if the screw hook ***100*** begins to rotate counter-clockwise on the horizontal axis ***310***, a force ***302*** from the upper wall of the first pair of parallel side walls ***212*** is applied to the first straight run ***120*** of the screw hook ***100***.

[23] Unlike conventional tools for anchoring an object with a shank ***105***, the screw hook socket ***200*** applies the forces ***301*** and ***302*** at an angle that is not perpendicular to the longitudinal axis of the shank ***105*** of the screw hook ***100***. As such, the screw hook

socket ***200*** is well suited for anchoring objects, such as the screw hook ***100***, that have straight runs ***120*** or ***121*** that are not parallel or perpendicular to the axis of rotation.

[24] Still referring to **FIG. 3**, the cavity also prevents the screw hook ***100*** from rotating along the longitudinal axis ***303*** of the screw hook. The second pair of parallel side walls ***214*** prevents rotation about the longitudinal axis ***303*** by applying a force to the screw hook ***100***. Unlike the forces from the first pair of side walls ***212***, the forces from the second pair of sidewalls ***214*** are in a perpendicular direction to the longitudinal axis ***303*** as is the case with other conventional tools.

[25] The size of the cavity may be suited to fit any size of screw hook ***100***. Typical screw hooks ***100*** have lengths that range from approximately 1 inch to 3 inches, diameters of the hook portion ***110*** that range from ½ inch to 1.5 inches, and thicknesses that range from .08 inches to .2 inches. The screw hook socket ***200*** is typically designed to fit one particular size of screw hook ***100*** in order to securely fit the contour of the hook portion 110 of the screw hook ***100***.

[26] **FIG. 4** is an exploded view of the screw hook socket ***200*** of **FIG. 2** with an extension pole mounting handle ***400*** according to an embodiment of the invention. In this embodiment, the screw hook socket ***200*** is designed to be mounted on an extension pole for use with working in more inaccessible places. The screw hook socket ***200*** includes a mounting bracket ***410*** designed to engage a receptacle ***411*** in an extension pole mounting handle ***400***. The extension pole mounting handle ***400*** is further designed to engage a typical extension pole ***401***. In one embodiment, the extension pole

mounting handle ***401*** engages the extension pole ***401*** with threads. Other engagement mechanisms are contemplated but are not disclosed here for brevity.

[27] By using an extension pole with the screw hook socket ***200***, one can reach more inaccessible places with the screw hook socket ***200*** for anchoring screw hooks. For example, screw hooks can be anchor on high ceilings or under awnings of a house using an extension pole ***401*** with a screw hook socket ***200***.

[28] Other mounting options are contemplated for the screw hook socket ***200*** but are not shown in the drawings for brevity. For example, the screw hook socket ***200*** may be mounted in a conventional way to a typical ratchet or wrench. Further, the screw hook socket ***200*** may be used in conjunction with a drive mechanism, *i.e.* power drill, ratchet, extension pole, having a jointed drive shaft, *i.e.* a universal joint. As such, the rotational axis of the drive mechanism may be a different angle than that of the longitudinal axis of the screw hook ***100***.

[29] From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention.